

Vehicle Tie Down Rail Conjoinment Structure

BACKGROUND OF THE INVENTION

1) FIELD OF THE INVENTION

The invention herein relates to automotive accessories, specifically a vehicle
5 tie down rail conjoinment structure in which when the two pipe segments of the tie
down rail are conjoined, the radially distributed force vectors of the two connectors
tightly bind the two pipe segments together.

2) DESCRIPTION OF THE RELATED ART

Passenger/cargo dual-use trucks equipped with drivers seats and open-beds
10 are in widespread use, such vehicles often having tie down rails installed along the
two sides of the bed; examples of these structures include US Pat. Nos. 5476349,
5618140, 6231285, and 6468009. In a typical arrangement, the tie down rail
usually has an anchor body disposed at each of its two extremities and a straight
tube is situated between the curved pipe section tube receiving ends connecting the
15 two anchor bodies, with a bolt hole or tie down member provided on the anchor
body for the attachment of lines.

Since the curved pipe sections of this category of tie down rail are
compression cast, there is a strong contrast in the glossy surface of the straight

stainless steel pipe sections where they are formed as well as inadequate structural quality, requiring a few unnecessary bolt holes or tie down components. The tie down rail is often a stainless steel tube stock, directly bent, one-piece fabrication having two curved pipe section at the sides and center straight pipe section in the middle for the tie down rail. However, as the length of tie down rail results in longer packaging area, shipping cost, and cargo placement problems, the straight pipe section and the curved pipe section are cut into two curved pipe sections and one straight pipe section which necessitates assembly. However, even after such a design, the conjoinment structure between the two cut rail pipes still requires further research and development.

SUMMARY OF THE INVENTION

The objective of the invention herein is to provide a vehicle tie down rail conjoinment structure comprised of a first connector having a mounting surface at one extremity and an oblique slip-thrust surface formed at the opposite extremity; a second connector having a mounting surface at one extremity and an oblique slip thrust surface formed at the opposite extremity; given the said structure, a threaded fastening component is utilized to conjoin the first connector and the second connector into a single physical entity, wherein the first connector is inserted into the inner diameter at the end section of the curved anchor footing of a vehicle tie

down rail and the second coupling section is inserted into the inner diameter of the straight, thin long pipe member at the end section of the vehicle tie down rail.

BRIEF DESCRIPTION OF THE DRAWINGS

Other features and advantages of the present invention will become
5 apparent in the following detailed description of the preferred embodiment, with
reference to the accompanying drawings in which:

Figure 1 is a cross-sectional drawing of the preferred embodiment structure
of the invention herein.

Figure 2 is an orthographic drawing of first connector depicted in FIG. 1, as
10 viewed from the left side.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the detailed description of the preferred embodiments, it should be noted
that similar elements are indicated by the same reference numerals throughout the
disclosure.

15 Referring to FIG. 1 and FIG. 2, the preferred embodiments of the invention
herein is comprised of:

A first connector 1 of a cylindrical shape having a mounting surface 11 at
the sealed tubular end section of one extremity and there is a hole 12 in the

mounting surface 11; an oblique slip thrust surface 13 facing away from the mounting surface 11 is formed at the opposite extremity; an annular flange 14 around the outer diameter of the first connector 1 that partitions it into a first coupling section 15 and a second coupling section 16, wherein the first coupling
5 section 15 has a first outer diameter that fits into the inner diameter of a curved anchor footing 2 at the end section of a vehicle tie down rail, the second coupling section 16 has a second outer diameter that fits into the inner diameter of a straight, thin long pipe member 3 at the end section of the vehicle tie down rail; wherein, the mounting surface 11 is situated at the end surface of the said first coupling
10 section 15, and the oblique slip thrust surface 13 is situated on the second coupling section 16; the annular flange 14 has an extension formed upward from one side and, furthermore, a lash hole 17 cleat section 18 is disposed on it.

A second connector 4 of a cylindrical shape having a mounting surface 41 at the sealed tubular end section of one extremity and there is a threaded hole 42 in
15 the mounting surface 41; an oblique slip thrust surface 43 facing away from the mounting surface 41 is formed at the opposite extremity; and the second connector 4 outer diameter fits into the inner diameter of the straight, thin long pipe member
3.

A threaded fastening component 5, a bolt consisting of a head section 51 at
20 one end, threads 52 at the other extremity, and a hexagonal socket 53 in the head

section 51, which is inserted through the first connector 1 mounting surface 11 hole 12 and screwed into the second connector 4 mounting surface 41 threaded hole 42.

To conjoin, the oblique slip thrust surface 13 and slip thrust surface 43 of the first connector 1 and the second connector 4 are first correspondingly placed in an upper-lower, male-female arrangement, and after the threaded fastening component 5 is tightened to an appropriate degree, the entire first connector 1 first coupling section 15 is inserted into the inner diameter at the end section of the curved anchor footing 2 of a vehicle tie down rail, and the first connector 1 second coupling section 16 along with the second connector 4 are inserted into the inner diameter of the straight, thin long pipe member 3 at the end section of the vehicle tie down rail to thereby completing conjoinment.

However, for conjoinment tightness, an opening 21 is cut into the curved anchor footing 2 to admit a hexagonal wrench tool 22 to tighten the threaded fastening component 5 such that when the slip thrust surface 13 and the slip thrust surface 43 are thereby brought together, the radially distributed force vectors the upper and lower extents of the first connector 1 and the second connector 4 against the inner diameter at the end section of the thin long pipe member 3, the said applied force affecting the end affixed to the curved anchor footing 2 on the vehicle, enabling the first connector 1 first coupling section 15 to be insertionally

retained in the inner diameter at the end section of the curved anchor footing 2, thereby effectively achieving a solid union.

During utilization, all the conjunction components can be installed in reverse, enabling the conjunction of the first connector 1 first coupling section 15
5 to the inner diameter at the end section of the straight, thin long pipe member 3 in vehicle tie down rail as well as the conjunction of the first connector 1 second coupling section 16 along with the second connector 4 to the inner diameter at the end section of the curved anchor footing 2; at the same time, the lash hole 17 disposed on the annular flange 14 provides for securing lines such as ropes and
10 cords.

While the present invention has been described in relation to what is considered the most practical and preferred embodiments, it is understood that the invention herein is not limited to the disclosed embodiments, but is intended to cover various arrangements included within the spirit and scope of the broadest
15 interpretations and equivalent arrangements.